Finisar

Product Specification

RoHS-6 Compliant
Laserwire™ XFP Adapter
FTLX0011D4BNL

PRODUCT FEATURES

- Hot-pluggable XFP footprint
- Supports Laserwire™ data rates of 9.95 Gb/s to 10.3 Gb/s
- RoHS-6 compliant (lead-free)
- Extended temperature range -5°C to 85°C
- Single 3.3V power supply
- Customizable EEPROM

APPLICATIONS

- Adapts Laserwire™ plug for XFP ports

Finisar's FTLX0011D4BNL 10Gb/s Laserwire™ XFP Adapters are designed for use in conjunction with Finisar's Laserwire cables (Part Numbers: FCBP110LD1Lxx and FCBC110LD1Lxx). The FTLX0011D4BNL XFP Adapter allows a Laserwire cable to be plugged into an XFP port. The XFP Adapter incorporates a customizable EEPROM. The Adapter is RoHS compliant and lead free per Directive 2002/95/EC[1], and Finisar Application Note AN-2038[2].

PRODUCT SELECTION

FTLX0011D4BNL

I. Background

Figure 1 illustrates the application of the FTLX0011D4BNL XFP Adapter. Pin descriptions for the FTLX0011D4BNL interface to the host board are shown in Section II. Please refer to the FCBP110LD1Lxx Laserwire datasheet for details of the interface between the FTLX0011D4BNL XFP Adapter and the Laserwire cable. The Laserwire connector pin-out is also shown in Section II for reference.

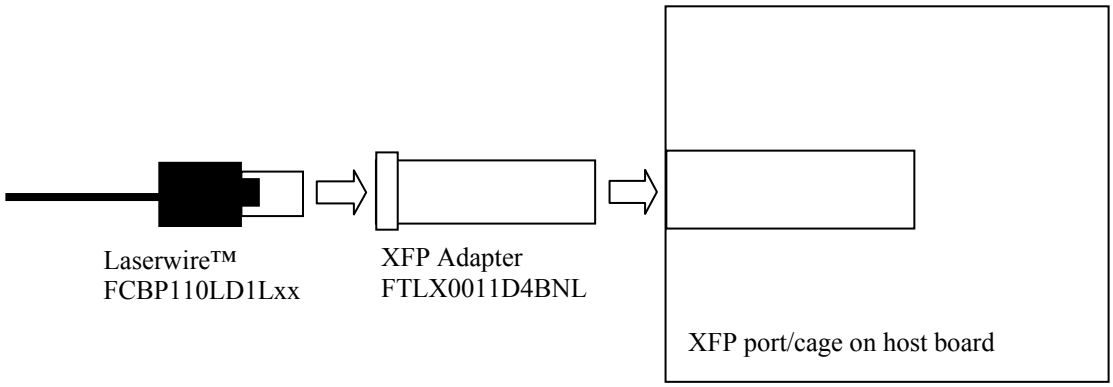

Figure 1. (Top View) From left to right: Laserwire, XFP Adapter, XFP cage on host board.

Insertion sequence: (1) XFP Adapter is plugged into XFP port; (2) Laserwire is plugged into Adapter.

Extraction sequence: (1) Depress tab on top of Laserwire plug and extract cable from Adapter; (2) Pull on Adapter bail release lever and extract Adapter from host port.

II. Pin Descriptions

Pin	Logic	Symbol	Name/Description (per INF-8077i)	Laserwire-Adapter Interface	Adapter-XFP Port Interface	Note
1		GND	Module Ground	Connected to Laserwire VEE	Grounded in adapter	1
2		VEE5	Optional -5.2 Power Supply – Not required	NC	NC	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	NC	Pulled high in adapter	2
4		Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface, NOT IMPLEMENTED	NC	NC	
5	LVTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off , NOT IMPLEMENTED.	NC	Pulled high in adapter	2
6		VCC5	+5 Power Supply – Not used.	NC	NC	
7		GND	Module Ground	Connected to Laserwire VEE	Grounded in adapter	1
8		VCC3	+3.3V Power Supply	Connected to Laserwire VCC pin 5	Pass through	
9		VCC3	+3.3V Power Supply	Connected to Laserwire VCC pin 5	Pass through	
10	LVTTL-I	SCL	Serial 2-wire interface clock	NC	Connected to adapter EEPROM	3
11	LVTTL-I/O	SDA	Serial 2-wire interface data line	NC	Connected to adapter EEPROM	3
12	LVTTL-O	Mod_Abs	Module Absent; Indicates adapter not present.	NC	Pulled low in adapter	4
13	LVTTL-O	Mod_NR	Module Not Ready	NC	Loss of lock in Tx/Rx	2
14	LVTTL-O	RX_LOS	Receiver Loss of Signal indicator	Connected to Laserwire Fault output pin 6	Pass through	3
15		GND	Module Ground	Connected to Laserwire VEE	Grounded in adapter	1
16		GND	Module Ground	Connected to Laserwire VEE	Grounded in adapter	1
17	CML-O	RD-	Receiver inverted data output	Laserwire RX- pin 11	Retimed output	5
18	CML-O	RD+	Receiver non-inverted data output	Laserwire RX+ pin 10	Retimed output	5
19		GND	Module Ground	Connected to Laserwire VEE	Grounded in adapter	1
20		VCC2	+1.8V Power Supply – Not used	Not used	NC	
21	LVTTL-I	P_Down/ RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset, NOT IMPLEMENTED Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. NOT IMPLEMENTED	NC	Pulled high in adapter	
22		VCC2	+1.8V Power Supply – Not used	Not used	NC	
23		GND	Module Ground	Connected to Laserwire VEE	Grounded in adapter	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	NC	Internally terminated	6
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board – Not required	NC	Internally terminated	6
26		GND	Module Ground	Connected to Laserwire VEE	Grounded in adapter	1
27		GND	Module Ground	Connected to Laserwire VEE	Grounded in adapter	1
28	CML-I	TD-	Transmitter inverted data input	Laserwire TX- pin 2	Retimed input	5
29	CML-I	TD+	Transmitter non-inverted data input	Laserwire TX+ pin 3	Retimed input	5
30		GND	Module Ground	Connected to Laserwire VEE	Grounded in adapter	1

Notes:
1. Adapter circuit ground is isolated from adapter chassis ground within the adapter.
2. Pulled up with 10kΩ in adapter
3. Open collector; should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 3.15V and 3.6V.
4. Pulled low with 100Ω in adapter.
5. Per XFI electrical specs.
6. A Reference Clock input is not required. If present, it will be ignored. Differential 100Ω termination in adapter.

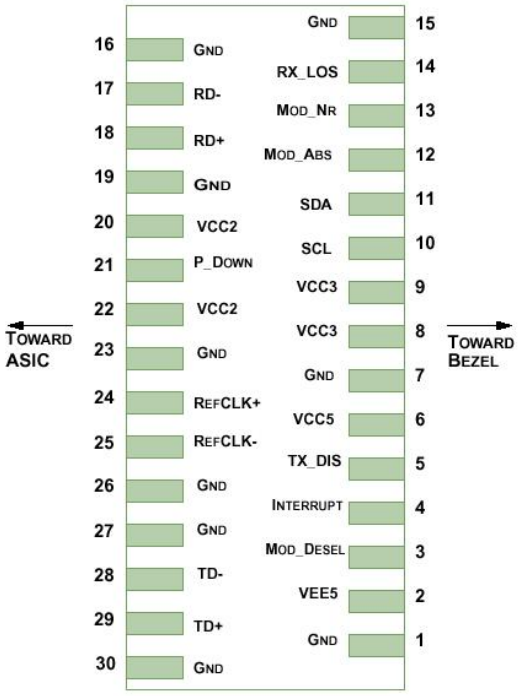

Figure 1. Diagram of Host Board Connector Block Pin Numbers and Names, for pin-out reference. Details of host-board connector specifications can be found in INF-8077i[3]. Or refer to Finisar XFP datasheet (e.g., FTLX8511D3)

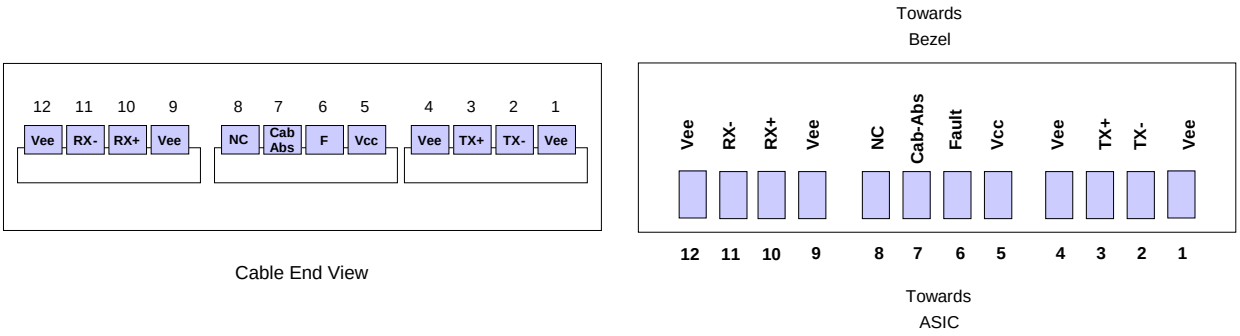
12 11 10 9 8 7 6 5 4 3 2 1
Vee RX- RX+ Vee NC Cab Abs F Vcc Vee TX+ TX- Vee
Cable End View
Towards Bezel
Vee RX- RX+ Vee NC Cab-Abs Fault Vcc Vee TX+ TX- Vee
12 11 10 9 8 7 6 5 4 3 2 1
Towards ASIC
(a)
(b)

Figure 2. Pinout : (a) Laserwire cable plug end view, (b) Adapter pin-out (Laserwire port endview).

III. Absolute Maximum Ratings

Exceeding the limits below may damage the transceiver module permanently.

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		4.0	V	
Storage Temperature	T_S	-40		85	°C	
Relative Humidity	RH	0		85	%	1

I. Non-condensing.

IV. Electrical Characteristics (T_{OP} = -5 to 85°C, V_{CC} = 3.14 to 3.46 Volts)

Electrical characteristics assume a Laserwire cable is inserted into the Adapter port.

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Voltage	Vcc	3.14		3.46	V	
Supply Current	Icc			400	mA	
Transmitter (to Laserwire)						
Differential data input swing	Vin,pp	120		1000	mV	
Receiver (from Laserwire)						
Differential data output swing	Vout,pp	600	650	800	mV	1
Power Supply Rejection	PSR	See Note 2 below				2

Notes:
1. Into 100Ω differential termination.
2. Per Section 2.7.1 in the XFP MSA Specification INF-8077i[3].

V. Environmental Specifications

The FTLX0011D4BNL XFP Adapter has an operating temperature range from -5°C to +85°C case temperature. Note that the Laserwire™ cable has an operating temperature range of 0°C to +60°C.

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Case Operating Temperature	T_{op}	-5		85	°C	
Storage Temperature	T_{sto}	-40		85	°C	

VI. Regulatory Compliance

These products are certified by TÜV and CSA to meet the Class 1 eye safety requirements of EN (IEC) 60825 and the electrical safety requirements of EN (IEC) 60950. Copies of certificates are available at Finisar Corporation upon request.

VII. Mechanical Specifications

Finisar's Laserwire XFP Adapters are compatible with the dimensions defined by the XFP Mechanical Specifications in INF-8077i[3], with the exception of the port design to accommodate the Laserwire plug.

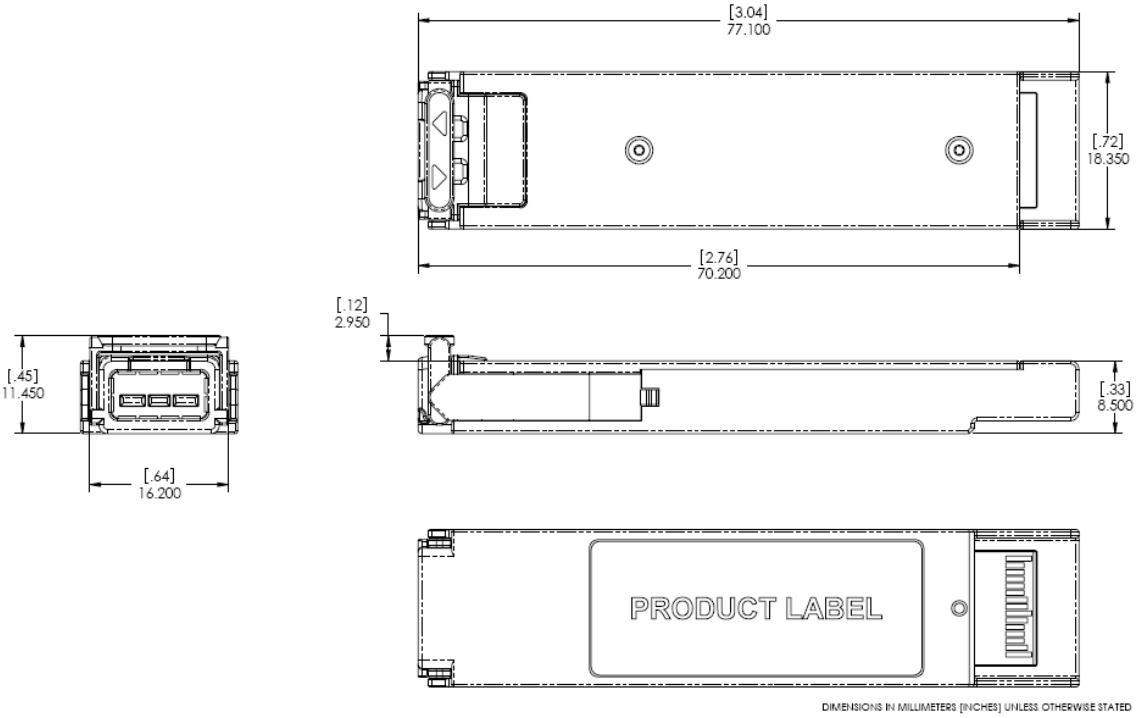

Figure 3. FTLX0011D4BNL Mechanical Dimensions.

VIII. EEPROM Table (Address A0h)

Byte Addr	Hex	LSB	Bit Size	Name	Description	Value	Hex Value
128	80	0	8	Identifier	Type of serial transceiver	XFP	6
129	81	0	3	RESERVED	RESERVED		
129	81	3	1	CLEI code present in Table 02h	CLEI code present in Table 02h	No CLEI code present in Table 02h	0
129	81	4	1	TX Ref Clock Input Required	TX Ref Clock Input Required	Not Required	1
129	81	5	1	Module with CDR	Module with CDR	with CDR	0
129	81	6	2	Ext.Identifier	Defines Module Power Class	Power level 1 (< 1.5W power dissipation)	0
130	82	0	8	Connector	Code for connector type	Unknown	0
131	83	0	1	RESERVED	RESERVED		
131	83	1	1	10GBASE-EW	10GBASE-EW	FALSE	0
131	83	2	1	10GBASE-LW	10GBASE-LW	FALSE	0
131	83	3	1	10GBASE-SW	10GBASE-SW	TRUE	1
131	83	4	1	10GBASE-LRM	10GBASE-LRM	FALSE	0
131	83	5	1	10GBASE-ER	10GBASE-ER	FALSE	0
131	83	6	1	10GBASE-LR	10GBASE-LR	FALSE	0
131	83	7	1	10GBASE-SR	10GBASE-SR	TRUE	1
132	84	0	4	RESERVED	RESERVED		
132	84	4	1	Intermediate Reach 1300 nm	Intermediate Reach 1300 nm FP	FALSE	0
132	84	5	1	Extented Reach 1550 nm	Extented Reach 1550 nm	FALSE	0
132	84	6	1	1200-SM-LL-L	1200-SM-LL-L	FALSE	0
132	84	7	1	1200-MX-SN-I	1200-MX-SN-I	TRUE	1
133	85	0	8	RESERVED	RESERVED		
134	86	0	1	RESERVED	RESERVED		
134	86	1	1	OC-48-LR	Lower speed link compliance code	FALSE	0
134	86	2	1	OC-48-IR	Lower speed link compliance code	FALSE	0
134	86	3	1	OC-48-SR	Lower speed link compliance code	FALSE	0
134	86	4	1	2xFC SMF	Lower speed link compliance code	FALSE	0
134	86	5	1	2xFC MMF	Lower speed link compliance code	FALSE	0
134	86	6	1	1000BASE-LX/1xFC SMF	Lower speed link compliance code	FALSE	0
134	86	7	1	1000BASE-SX/1xFC MMF	Lower speed link compliance code	FALSE	0
135	87	0	2	RESERVED	RESERVED		
135	87	2	1	I-64.5	Sonet codes	FALSE	0
135	87	3	1	I-64.3	Sonet codes	FALSE	0
135	87	4	1	I-64.2	Sonet codes	FALSE	0
135	87	5	1	I-64.2r	Sonet codes	FALSE	0
135	87	6	1	I-64.1	Sonet codes	FALSE	0
135	87	7	1	I-64.1r	Sonet codes	FALSE	0
136	88	0	1	RESERVED	RESERVED		
136	88	1	1	S-64.5b	Sonet Short Haul Link codes	FALSE	0
136	88	2	1	S-64.5a	Sonet Short Haul Link codes	FALSE	0
136	88	3	1	S-64.3b	Sonet Short Haul Link codes	FALSE	0
136	88	4	1	S-64.3a	Sonet Short Haul Link codes	FALSE	0
136	88	5	1	S-64.2c	Sonet Short Haul Link codes	FALSE	0
136	88	6	1	S-64.2a	Sonet Short Haul Link codes	FALSE	0
136	88	7	1	S-64.1	Sonet Short Haul Link codes	FALSE	0
137	89	0	1	RESERVED	RESERVED		
137	89	1	1	DWDM	DWDM	FALSE	0
137	89	2	1	G.959.1 P1L1-2D2	Sonet Long Haul Link codes	FALSE	0
137	89	3	1	L-64.3	Sonet Long Haul Link codes	FALSE	0
137	89	4	1	L-64.2c	Sonet Long Haul Link codes	FALSE	0
137	89	5	1	L-64.2b	Sonet Long Haul Link codes	FALSE	0
137	89	6	1	L-64.2a	Sonet Long Haul Link codes	FALSE	0
137	89	7	1	L-64.1	Sonet Long Haul Link codes	FALSE	0
138	8A	0	5	RESERVED	RESERVED		
138	8A	5	1	V-64.3	Sonet Very Long Haul Link codes	FALSE	0
138	8A	6	1	V-64.2b	Sonet Very Long Haul Link codes	FALSE	0
138	8A	7	1	V-64.2a	Sonet Very Long Haul Link codes	FALSE	0
139	8B	0	3	RESERVED	RESERVED		
139	8B	3	1	RZ	Encoding Support	FALSE	0
139	8B	4	1	NRZ	Encoding Support	TRUE	1
139	8B	5	1	Sonet Scrambled	Encoding Support	TRUE	1
139	8B	6	1	8B/10B	Encoding Support	TRUE	1
139	8B	7	1	64B/66B	Encoding Support	TRUE	1

Byte Addr	Hex	LSB	Bit Size	Name	Description	Value	Hex Value
140	8C	0	8	BR, minimum	Minimum Supported Bitrate (/100Mb)	99	63
141	8D	0	8	BR, maximum	MaximumSupported Bitrate (/100Mb)	105	69
142	8E	0	8	Length(SMF)-km	Length (standard singlemode fiber)-km	0	0
143	8F	0	8	Length(EMM-50um)-meter	Length (extended b/w 50 um MMF) (/2m)	15	0F
144	90	0	8	Length(50)-meter	Length (50um MMF) (/1meter)	30	1E
145	91	0	8	Length(62.5)-meter	Length (62.5um MMF) (/1meter)	30	1E
146	92	0	8	Length(Copper)-km	Length (Copper) (/1meter)	0	0
…							
164	A4	0	1	XFI Loopback Supported	CDR support	TRUE	1
164	A4	1	1	Lineside Loopback Mode Supported	CDR support	FALSE	0
164	A4	2	1	RESERVED	RESERVED		
164	A4	3	1	CDR support for 11.1 Gb/s	CDR support	FALSE	0
164	A4	4	1	CDR support for 10.7 Gb/s	CDR support	FALSE	0
164	A4	5	1	CDR support for 10.5 Gb/s	CDR support	TRUE	1
164	A4	6	1	CDR support for 10.3 Gb/s	CDR support	TRUE	1
164	A4	7	1	CDR support for 9.95 Gb/s	CDR support	TRUE	1
…							
190	BE	0	8	Max Case Temp	Max Case Temp.	85	55
191	BF	0	8	CC_BASE	Checksum (128 to 190)	TBC	TBC
192	C0	0	8	Maximum Power	Maximum Power Dissipation, Max power is 8 bit value * 20 mW.	75	4B
193	C1	0	8	Max Power in Power Down Mode	Maximum Total Power Dissipation in Power Down Mode, Max Power is 8 bit value * 10 mW.	150	96
194	C2	0	4	Max Current +3.3v	Maximum current required by +3.3V Supply. Max current is 4 bit value * 100	3	3
194	C2	4	4	Max Current +5v	Maximum current required by +5V Supply.Max current is 4 bit value * 50	0	0
195	C3	0	4	Max Current -5v	Maximum current required by -5.2V Supply.Max current is 4 bit value * 50 mA. [500 mA max]	0	0
195	C3	4	4	Max Current +1.8v	Maximum current required by +1.8V Supply. Max current is 4 bit value * 100	0	0
…							
220	DC	0	3	RESERVED	RESERVED		
220	DC	3	1	Received power meas. Type	Special functions	Average power	1
220	DC	4	1	FEC BER support	Special functions	FALSE	0
220	DC	5	1	RESERVED	RESERVED		
220	DC	6	1	RESERVED	RESERVED		
220	DC	7	1	RESERVED	RESERVED		
221	DD	0	1	Optional CMU support mode	Enhanced Options	FALSE	0
221	DD	1	1	Wavelength Tunability implemented	Enhanced Options	FALSE	0
221	DD	2	1	Active FEC control function umplemented	Enhanced Options	FALSE	0
221	DD	3	1	Support VPS bypass regulator mode	Enhanced Options	FALSE	0
221	DD	4	1	Suport VPS LV regulator mode	Enhanced Options	FALSE	0
221	DD	5	1	Soft P_Down	Enhanced Options	FALSE	0
221	DD	6	1	Soft TX_DISABLE	Enhanced Options	FALSE	0
221	DD	7	1	Variable Power Supply Support	Enhanced Options	FALSE	0
222	DE	0	4	Aux A/D Input 2	Enhanced Options	Auxiliary monitoring not implemented	0
222	DE	4	4	Aux A/D Input 1	Enhanced Options	Auxiliary monitoring not implemented	0
…							

IX. References

1. Directive 2002/95/EC of the European Council Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment". January 27, 2003.

2. "Application Note AN-2038: Finisar Implementation Of RoHS Compliant Transceivers", Finisar Corporation, January 21, 2005.

3. "10 Gigabit Small Form Factor Pluggable Module", SFF Document Number INF-8077i, Revision 4.5, August 31, 2005.

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